

## **Remarks**

### **The claimed invention**

The present invention is directed to electromechanical devices that comprise substantially planar electroactive ceramic members. These members have grooves or slots formed therein, for example via laser machining. The grooves allow the ceramic member to conform to a curved surface. The slots multiply an electromechanical bending response of a bimorph ceramic member. The grooves or slots may be arranged, for example, in a substantially parallel or a substantially concentric array.

Claim 2 has been cancelled with this response, and claim 17 has been amended to more clearly recite what Applicants consider to be the invention.

### **The prior art**

Ayusawa is a Japanese published patent application that describes a method of forming a compound piezoelectric element. Parallel grooves are formed in a green ceramic sheet and filled in with wax or another removable material. The composite of the green sheet and the wax is sufficiently flexible to be wound into a cylinder. Once wound, the composite is fired to burn out the wax and sinter the ceramic, obtaining a cylindrical element having longitudinal holes therethrough.

Roshon is a US Patent that describes several electroacoustical transducers. Small, flat transmitters and receivers are formed in a mosaic structure on a supporting member in a variety of geometrical configurations (col. 3, lines 68-74; col. 4, lines 55-73). The transmitters and receivers are insulated from one another by insulating material, such as Glyptal (col. 3, lines 38-44).

### **Rejections under 35 U.S.C. § 102**

Claims 17, 18, and 20 stand rejected under 35 U.S.C. § 102(b) as anticipated by Ayusawa. This rejection is respectfully traversed for the reasons set forth below.

As amended, independent claim 17 recites an electromechanical device comprising a substantially planar electroactive ceramic member. The member includes grooves that allow it to bend to conform to a curved surface.

Ayusawa describes bending a *green* (unfired) ceramic precursor into a cylindrical shape. The precursor is then fired, forming a stiff composite element. Thus, at no point does Ayusawa describe an *electroactive* ceramic member that can bend and conform to a curved surface. The green ceramic is not yet an electroactive ceramic member, and the fired composite does not bend. Thus, independent claim 17, and its dependent claims 18 and 20, are not anticipated by Ayusawa. Applicants respectfully request reconsideration and withdrawal of the rejection.

Claims 17, 18, and 20-25 stand rejected under 35 U.S.C. § 102(b) as anticipated by Roshon. This rejection is respectfully traversed for the reasons set forth below.

Roshon describes a number of transducer geometries, but none of them are constructed from a substantially planar electroactive ceramic member comprising grooves. The structures identified in the Office Action, shown in Figs. 7a and 7b, are described as *mosaics* of individual transducer elements (see col. 3, lines 54-74; col. 4, lines 55-73), that is, arrangements of completely separate transducer elements. In contrast, independent claim 17 recites a single planar member having grooves defined thereon. Thus, independent claim 17, and its dependent claims 18, 20, and 21, are not anticipated by Roshon. Applicants respectfully request reconsideration and withdrawal of the rejection.

Similarly, independent claim 22 recites a single planar bimorph electroactive ceramic member having slots defined therein, the slots acting to multiply an electromechanical bending response of the bimorph member. This recited structure is not anticipated by the mosaic arrangement of Roshon. Thus, independent claim 22, and its dependent claims 23-25, are not anticipated by Roshon. Applicants respectfully request reconsideration and withdrawal of the rejection.

#### Rejections under 35 U.S.C. § 103

Claim 19 stands rejected under 35 U.S.C. § 103(a) as obvious over either Ayusawa or Roshon. This rejection is respectfully traversed for the reasons set forth below.

Claim 19 depends from independent claim 17 and incorporates all of its limitations. As discussed above, both Ayusawa and Roshon fail to teach or suggest an electromechanical device comprising an electroactive member having grooves defined thereon, wherein the grooves allow the electroactive member to bend to conform to a curved surface, as recited by claim 17. Thus,

these references also cannot render claim 19 obvious. Applicants respectfully request reconsideration and withdrawal of the rejection.

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Respectfully submitted,

A handwritten signature in black ink, appearing to read "Elizabeth E. Nugent", written over a horizontal line.

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